

## WHAT IS CLAIMED IS:

1 1. A process for automatically translating a specification defining a computer program  
2 to be automatically written by a computer into a computer program that implements the  
3 requirements of said specification, said specification defining at least classes of objects  
4 having attributes, services and relationships with other classes, said specification written  
5 in a formal language, comprising:

6 using a computer, automatically write computer code that will request user name  
7 and password, receive any responses and authenticate the user;

8 using a computer, automatically write computer code that will determine this  
9 user's privilege level and query said formal language specification and determine all  
10 object attributes this user has privilege to see and all services this user can invoke;

11 using a computer, automatically write computer code which queries said  
12 specification for all services of all classes that any authorized user may invoke and  
13 identifies an object server which will implement said service;

14 using a computer, automatically write code that will retrieve service arguments  
15 for all services from a user or from another object server or from another process, as  
16 appropriate;

17 using a computer, automatically write code that displays menus options, icons or  
18 creates any other means by which a user or another process can invoke a service, and  
19 which receives input to invoke a particular service and responds by sending a message  
20 to the appropriate object server to invoke the service, said message including the  
21 necessary arguments for the service to execute;

22 using a computer, automatically write code that implements an object server for  
23 every service, each of which first checks to verify that state transitions are valid and  
24 make sense for the current state of objects the object service will be altering the state  
25 of;

using a computer, automatically write code for every object server that verifies preconditions are satisfied before making state transitions of any objects the states of which are acted upon by the object server;

using a computer, automatically write code to make all valuation calculations required by said specification of each object server;

using a computer, automatically write code to verify that integrity constraints specified in said specification on the values of attributes of objects have been satisfied after execution of a service and take action if said integrity constraints are not satisfied; and

using a computer, automatically write code for every object server to test trigger relationships specified in said specification after execution of a service and carry out appropriate action if a trigger event has occurred.

2. An apparatus for automatically translating a specification defining a computer program to be automatically written by a computer into a computer program that implements the requirements of said specification, said specification defining at least classes of objects having attributes, services and relationships with other classes, said specification written in a formal language, comprising:

a computer programmed to perform the following functions:

automatically write computer code that will request user name and password, receive any responses and authenticate the user;

automatically write computer code that will determine this user's privilege level and query said formal language specification and determine all object attributes this user has privilege to see and all services this user can invoke;

automatically write computer code which queries said specification for all services of all classes that any authorized user may invoke and identifies an object server which will implement said service;

15 automatically write code that will retrieve service arguments for all services  
 16 from a user or from another object server or from another process, as appropriate;  
 17 automatically write code that displays menus options, icons or creates any  
 18 other means by which a user or another process can invoke a service, and which receives  
 19 input to invoke a particular service and responds by sending a message to the  
 20 appropriate object server to invoke the service, said message including the necessary  
 21 arguments for the service to execute;  
 22 automatically write code that implements an object server for every service,  
 23 each of which first checks to verify that state transitions are valid and make sense for  
 24 the current state of objects the object service will be altering the state of;  
 25 automatically write code for every object server that verifies preconditions  
 26 are satisfied before making state transitions of any objects the states of which are  
 27 acted upon by the object server;  
 28 automatically write code to make all valuation calculations required by said  
 29 specification of each object server;  
 30 automatically write code to verify that integrity constraints specified in said  
 31 specification on the values of attributes of objects have been satisfied after execution  
 32 of a service and take action if said integrity constraints are not satisfied; and  
 33 automatically write code for every object server to test trigger relationships  
 34 specified in said specification after execution of a service and carry out appropriate  
 35 action if a trigger event has occurred.

1 3. A computer-readable medium containing instructions for controlling a computer to  
 2 automatically translate a specification defining a computer program to be automatically  
 3 written by a computer into a computer program that implements the requirements of  
 4 said specification, said specification defining at least classes of objects having

5 attributes, services and relationships with other classes, said specification written in a  
6 formal language, by:

7 automatically writing computer code that will request user name and password,  
8 receive any responses and authenticate the user;

9 automatically writing computer code that will determine this user's privilege  
10 level and query said formal language specification and determine all object attributes  
11 this user has privilege to see and all services this user can invoke;

12 automatically writing computer code which queries said specification for all  
13 services of all classes that any authorized user may invoke and identifies an object  
14 server which will implement said service;

15 automatically writing computer code that will retrieve service arguments for  
16 all services from a user or from another object server or from another process, as  
17 appropriate;

18 automatically write code that displays menus options, icons or creates any  
19 other means by which a user or another process can invoke a service, and which receives  
20 input to invoke a particular service and responds by sending a message to the  
21 appropriate object server to invoke the service, said message including the necessary  
22 arguments for the service to execute;

23 automatically writing code that implements an object server for every  
24 service, each of which first checks to verify that state transitions are valid and make  
25 sense for the current state of objects the object service will be altering the state of;

26 automatically write code for every object server that verifies preconditions  
27 are satisfied before making state transitions of any objects the states of which are  
28 acted upon by the object server;

29 automatically write code to make all valuation calculations required by said  
30 specification of each object server;

31 automatically write code to verify that integrity constraints specified in said  
32 specification on the values of attributes of objects have been satisfied after execution  
33 of a service and take action if said integrity constraints are not satisfied; and  
34 automatically write code for every object server to test trigger relationships  
35 specified in said specification after execution of a service and carry out appropriate  
36 action if a trigger event has occurred.

0937233-060101